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Advanced motor test bench developments for beamline motion system characterization

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Efficient motorization of beamline components plays a key role in making optimal use of beamtime. Since the performance of motion systems strongly depends on the interaction between motor and controller, testing outside the beamline remains an essential step. Building on an established modular motor test bench*, several new developments have been introduced to better replicate typical beamline applications. To address coordinated movement of multiple axis, a new setup for synchronized multi-axis motion testing has been developed. It is based on a bending unit that enables evaluation of coordinated motion behavior under realistic conditions. In addition to synchronized motion, high gear ratio drive systems are commonly used at the beamline. A test rig with a belt-driven transmission has been designed to simulate these conditions. To emulate the linear inertia of conventional screw drive systems, a modular shaft system with interchangeable discs has been implemented. These enhancements expand the range of test scenarios and enable more targeted selection of motor-controller combinations. An overview of the new systems and selected measurement results will be presented.

Footnotes

* D.Kraft et al., "Test Bench for Motor and Motion Controller Characterization", 19th Int. Conf. Accel. Large Exp. Phys. Control Syst., Cape Town, South Africa, Oct 2023 , doi:10.18429/JACoW-ICALEPCS2023-TUPDP015

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